CHATZIIOANNIDIS, Christos (Supervisor: Hamish Taylor)

Web Metabrowser: A web browser implemented on top of browser

The purpose of this dissertation is the design and construction of a Web Metabrowser that will provide a number of services to the user. In particular, the application allows the user to bookmark websites and rate websites upon some criteria, edit the bookmarks and create notes attached to websites. Furthermore the Metabrowser offers History control and history representation of the websites visited by the user with the use of a chart.

The present dissertation comprises ten chapters. The first chapter analyses the aims and objectives of the Web Metabrowser project. The second chapter presents a Literature Review that introduces the Web Metabrowser and its services, explains its significance, and presents relevant work for each of the services that the application offers. The third chapter addresses the research methods that are used in the project. The fourth chapter analyses the requirements of the project. The fifth chapter refers to the social, professional, ethical and legal issues of the project. The sixth analyses the project tasks with the use of a Gantt chart. The seventh chapter describes the design of the user interface of the application while the eighth analyzes the implementation and the difficulties that have been encountered. The ninth chapter displays the testing and evaluation results. Finally the tenth chapter provides a conclusion to the project and also makes suggestions for future work and improvements.

DELIGIANNIS, Anastasios (Supervisor: Hans-Wolfgang Loidl)

High Performance Cloud Computing For Symbolic Computation

Computing plays a very important role in today's scientific research, due to the complexity of the problems introduced during the research procedure and the massive data created for their solutions. High performance computing is the field of informatics that aims to solve problems that require significant computer resources, by exploiting the power of many computational units at the same time. There are many programming models that are used for this purpose. One of these models, is the "message passing" programming model. According to this model, computers are communicating through network via simple messages. Such programs are executed on networks of computers that are very expensive and difficult to maintain. Cloud computing can help in overcoming these difficulties by adding flexibility and portability to execution environments. Virtual infrastructures can make the migration of platform dependent scientific applications an easy procedure. They can also enable the usage of distant on-demand computing resources. There are several open source platforms for cloud computing. The most important of them are OpenStack, OpenNebula and Nimbus. Each of them has its own characteristics and they are trying to solve the same problem from a different point of view. A very important field of scientific computing is symbolic computation, which applies on many real life problems. A good example of such computation is the determinisation of nondeterministic finite state automata. In this project we built a virtual cluster infrastructure and tested a determinisation application. The most important characteristic of this application is that it needs massive hard disk resources in order to run efficiently. The testing of this application
provides us with evidence about how such applications behave on virtualized environments.

MIMTSOUDIS, Ioannis (Supervisor: Nick Taylor)
A mobile app for submitting questions during a lecture
Achieving active learning and increasing interactivity in traditional classrooms is not an easy process. Several electronic educational systems have been developed and used in order to achieve it. The most recent achievements in this area are mobile and web based systems. These systems mainly allow students to answer multiple choice questions posed by the lecturer. None of them allows a student to initialize an interaction by posing a question.

Identifying this gap in existing technologies, an application for asking questions in a classroom was developed, taking advantage of mobile and web/cloud based technologies. The purpose of this application is to facilitate interactivity in a classroom. An Android application was developed in order to enable students to submit questions during a lecture. Questions are displayed on a screen visible by everyone in the classroom. Furthermore, questions are processed in order to avoid duplicated questions on the screen. Last, a web application was developed in order to trace questions and allow a lecturer to get feedback.

The evaluation of the questioning system has revealed a number of interesting results. To begin with, the application would motivate students to ask questions and thus increase interactivity. Also, particular student groups would be benefited most, such as shy, unconfident and foreign students. Furthermore, results indicate that a balance between personal and electronic interaction is necessary. Additionally, reputation points could motivate students to use the application and increase classroom interactivity and participation as physical presence is required. The majority of evaluators reported that they would have used the application if it was available in a classroom. Last, results indicate that males are more sceptical than females about the usefulness of the application.

Furthermore, this project includes a literature review, explanation of professional, legal, ethical and social issues, requirements analysis and future recommendations.

PANAGIOTOPoulos, Konstantina (Supervisor: Hans-Wolfgang Loidl)
Assessing Modern Parallel Programming Languages
The growing development of high performance machines has led to the need for new software, able to fully utilize the potential of the underlying hardware (as multi-cores). A serial program, nowadays, is considered a slow program and it is unable to profit from the increasing number of cores of modern hardware. On the other hand, parallel programs are difficult to develop and tune, and this constitutes one of the main challenges for the software industry today.

Within this context, during the last decade, research has focused on the development of novel parallel languages, which will address modern hardware, and in particular multi-core processors. The Partitioned Global Address Space (PGAS) programming model is a promising new approach, introducing the idea of global view of physically distributed data.
Based on this principle, a new “family” of languages has emerged, referred to as PGAS languages.

This project performs a detailed assessment of three out of five languages of the PGAS family, Chapel by Cray Inc., X10 by IBM Research and Unified Parallel C (UPC) by the University of California, Berkeley. The assessment covers programmability as well as performance. It addresses issues of technical features, usability of development tools and current community work on the languages. In order to assess performance, we implement three versions of the same algorithm and compare their performance on distributed and shared memory configurations. The application selected is the N-body problem, a data intensive calculative problem used in astrophysics and molecular biology. The algorithm used is the all-pairs algorithm, which requires full data exchange and therefore represents a stress-test for the communication support of the languages.

VON PREUSCHEN-LEWINSKI, Maximilian (Supervisor: Peter King)
Native vs. Web – Developing a mobile application for a travel-management software
Since smartphones and tablets have become so successful over the last few years, the market for mobile applications is bigger than it ever was.

Every platform comes with its own API: Android applications are written in Java – iOS apps in Objective-C. However it might not always be possible or even reasonable to develop the same application several times.

Opposed to the native approach stands the idea of creating apps using HTML5. These apps should work on every smartphone or tablet just by using a browser.

The general part of this project is about comparing the existing technologies available for app development today. It highlights the advantages and disadvantages of building native applications compared to the development of HTML5 apps.

Hybrid systems promise to bring together the best of both worlds. A mobile app for the travel management system “Levima” is designed and implemented with the Titanium framework. The development process is analysed and the final app is evaluated to figure out, if the hybrid attempt is eligible.